Table 2: **p24** 

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Location	WEAU	Sequence	Immunogen	Species(HLA)	References
p24(133–147 IIIB B10)	p24(1-15)	PIVQNIQGQMVHQAI	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • Peptides we this peptide	<b>TES:</b> Peptides were identified that commonly evoke T-cell responses – 62% of 90 HIV+this peptide	cell responses – 62% of 90	) HIV+ people had a T-cell response to	ll response to
p24(133–154 SF2)	p24(1–22) <b>NOTES:</b>	PIVQNIQGQMVHQAISPRTLNA	HIV-1 infection	human	[Rosenberg et al.(1997)]
	<ul><li>While ant proliferati</li><li>The domi</li></ul>	<ul> <li>While anti-HIV CD4 T helper responses are characteristically undetectable in chronic infections, strong p24-specific proliferative responses were inversely correlated with low viral load in 10 chronically infected people</li> <li>The dominant proliferative response in one of two long term survivors was to this peptide</li> </ul>	teristically undetectable in the low viral load in 10 changes term survivors was to	n chronic infections, strong ronically infected people o this peptide	; p24-specific
p24(143–157)	p24(11-26)	VHQAISPRTLNAWVKC	Peptide stimulation in vitro	human	[Bedford et al.(1997)]
	NOTES:  • This epito • Matches 3	<b>IES:</b> This epitope elicits a primary proliferative response in PBMC from uninfected donors Matches 3/3 anchor residues for HLA DR: VHQAISPRT	se in PBMC from uninfect	ed donors	
p24(153–167)	p24(21-36)	NAWVKVVEEKAFSPEC	Peptide stimulation in vitro	human	[Bedford et al.(1997)]
	NOTES:  • This epito	<b>TES:</b> This epitope elicits a primary proliferative response in PBMC from uninfected donors	se in PBMC from uninfect	ed donors	
p24(163–177)	p24(31–46)	AFSPEVIPMFSALSEC	Peptide stimulation in vitro	human (A*0201)	[Bedford et al.(1997)]
	NOTES:  This epitce This peptide bi Peptide bi	<b>TES:</b> This epitope elicits a primary proliferative response in PBMC from uninfected donors This peptide contains a CTL epitope identified in HIV-positive patients Peptide binds to HLA A*0201 and causes regulation of class I expression on T2 cells Matches 3/3 anchor residues for HLA DR: VIPMFSALS	se in PBMC from uninfect HIV-positive patients on of class I expression or	ed donors 1 T2 cells	
p24(163–184 SF2)	p24(31–52) <b>NOTES:</b>	AFSPEVIPMFSALSEGATPQDL	HIV-1 infection	human	[Rosenberg et al.(1997)]
	<ul><li>Low viral</li><li>A prolifer</li></ul>	Low viral load correlated with strong HIV-1-specific proliferative response A proliferative response to this epitope was detected in two long term survivors	fic proliferative response ed in two long term surviv	ors	

## HIV Helper-T Cell Epitopes

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Location	WEAU	Sequence	ımmunogen	Species(HLA)	Keierences
p24(173–187)	p24(41–56)	SALSEGATPQDLNTMC	Peptide stimulation in vitro	human	[Bedford et al.(1997)]
	NOTES:  • This epito	TES:  This epitope elicits a primary proliferative response in PBMC from uninfected do:	onse in PBMC from uninfe	eted donors	
p24(180–194)	p24(48–62) <b>NOTES:</b>	TPQDLNTMLNTVGGH	HIV-1 infection	human	[Adams et al.(1997)]
	<ul><li>One of fo</li><li>Homolog</li><li>T cells fro</li><li>Improved</li><li>Inprolife</li></ul>	One of four immunogenic Gag peptides used in study of proliferative response to Homology to an SIV epitope recognized by macaque T-cells T cells from 8 of 19 HIV+ individuals responded to this epitope Improved assay system (increase in culture time to 8 days and addition of IL-2 to of proliferative response	to study of proliferative respondence to this epitope to 8 days and addition of 1	nse to p24 L-2 to cultures) gave increased detection	ased detection
p24(183–197)	p24(51–66)	DLNTMLNTYGGHQAAC	Peptide stimulation in vitro	human	[Bedford et al.(1997)]
	NOTES:  • This epito	TES:  This epitope elicits a primary proliferative response in PBMC from uninfected donors	onse in PBMC from uninfe	eted donors	
p24(203–217)	p24(71–86)	ETINEEAAEWDRVHPC	Peptide stimulation in vitro	human	[Bedford et al.(1997)]
	NOTES:  • This epito	<b>TES:</b> This epitope elicits a primary proliferative response in PBMC from uninfected donors	onse in PBMC from uninfeo	ed donors	
p24(208–222 IIIB B10)	p24(76–90)	EAAEWDRVHPVHAGP	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	• 12 gag an	12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses	at could commonly evoke	F-cell responses	
p24(208–217)	p24(76–85) <b>NOTES:</b>	EAAEWDRVHP	HIV-1 infection	human	[Adams et al.(1997)]
	<ul><li>One of fo</li><li>T cells fro</li><li>Improved of prolife</li></ul>	One of four immunogenic Gag peptides used in study of the proliferative response to p24 T cells from 11 of 24 HIV+ individuals responded to this epitope Improved assay system (increase in culture time to 8 days and addition of IL-2 to cultures of proliferative response	study of the proliferative reled to this epitope e to 8 days and addition of l	esponse to p24 L-2 to cultures) gave increased detection	eased detection
p24(215–229 SF2)	p24(81–95) <b>NOTES:</b> • Response	81–95) DRVHPVHAGPIAPGQ SF2 p24:Ty-VLP macaque (TES:	SF2 p24:Ty-VLP	macaque	[Mills et al.(1990)]

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
p24(213–234 SF2)	p24(81–102)	DRVHPVHAGPIAPGQMR- EPRGS	HIV-1 infection	human	[Rosenberg et al.(1997)]
	NOTES:  • While anti-l proliferative  • The domina	While anti-HIV CD4 T helper responses are characteristically undetectable in chronic infections, strong p24-specific proliferative responses were inversely correlated with low viral load in 10 chronically infected people. The dominant proliferative response in one of two long term survivors was to this peptide	steristically undetectable vith low viral load in 10 c long term survivors was	in chronic infections, strong hronically infected people to this peptide	g p24-specific
p24(219–233	p24(87–101)	HAGPIAPGQMREPRG	peptide	$murine(H-2^b)$	[Vaslin et al.(1994)]
BRO)	NOTES: • Peptide G2:	OTES:  Peptide G2: could prime for <i>in vitro</i> immunoproliferative responses and for subsequent IgG responses	ferative responses and for	· subsequent IgG responses	
p24(228–235 LAI)	p24(96–103)	MREPRGSD?	HIV infection	human	[Schrier et al.(1989)]
	• Stimulates	TES: Stimulates T-cell proliferation in HIV-infected donors	iors		
p24(228–242 IIIB B10)	p24(96–110)	MREPRGSKIAGTTST	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	NOTES: • 12 gag and	TES: 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses	could commonly evoke T	-cell responses	
p24(235–249 SF2)	p24(101–115)	GSDIAGTTSTLQEQI	SF2 p24:Ty-VLP	macaque	[Mills et al.(1990)]
	• Responses clone	<ul> <li>Responses to 3 T-cell and multiple linear B-cell epitopes were found in vaccinated macaques – defined by T-cell clone</li> </ul>	epitopes were found in v	accinated macaques – defi	ned by T-cell
p24	p24(101–116)	GSDIAGTTSTLQEQIC	Peptide stimulation in vitro	human	[Bedford et al.(1997)]
	NOTES: • This epitop	<b>TES:</b> This epitope elicits a primary proliferative response in PBMC from uninfected donors	e in PBMC from uninfec	ted donors	
p24(243–264 SF2)	p24(111–132) <b>NOTES:</b>	LQEQIGWMTNNPPIPVGEIYKR	HIV-1 infection	human	[Rosenberg et al.(1997)]
	<ul><li>Low viral lo</li><li>A proliferat</li></ul>	Low viral load correlated with strong HIV-1-specific proliferative response A proliferative response to this epitope was detected in two long term survivors	fic proliferative response ed in two long term survi	VOTS	

## HIV Helper-T Cell Epitopes

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
p24(253–267)	p24(121–136)	NPPIPVGEIYKRWIIC	Peptide stimulation in vitro	human	[Bedford et al.(1997)]
	NOTES: • This epitope	<b>TES:</b> This epitope elicits a primary proliferative response in PBMC from uninfected donors	in PBMC from uninfecte	d donors	
p24(263–284 SF2)	p24(131–152) <b>NOTES:</b>	KRWIILGLNKIVRMYSPTSILD	HIV-1 infection	human	[Rosenberg et al.(1997)]
	<ul><li>Low viral lo:</li><li>A proliferati</li></ul>	Low viral load correlated with strong HIV-1-specific proliferative response A proliferative response to this epitope was detected in two long term survivors	proliferative response in two long term survivo	TS	
p24(267–286)	p24(135–154) <b>NOTES:</b>	ILGLNKIVRMYSPTSILDIR	HIV-1 infection	human	[Adams et al.(1997)]
	<ul><li>One of four i</li><li>8 of 24 HIV-</li></ul>	One of four immunogenic Gag peptides used in study of the proliferative response to p24 8 of 24 HIV+ individuals responded to this epitope	y of the proliferative resp	onse to p24	
	<ul> <li>Improved assay system ( of proliferative response</li> </ul>	Improved assay system (increase in culture time to 8 days and addition of IL-2 to of proliferative response	days and addition of IL-	2 to cultures) gave increased detection	sed detection
p24(265–279 SF2)	p24(131–145) <b>NOTES:</b>	KRWIILGLNKIVRMY	SF2 p24:Ty-VLP	macaque	[Mills et al.(1990)]
	• Responses to clone	Responses to 3 T-cell and multiple linear B-cell epitopes were found in vaccinated macaques – defined by T-cell clone	itopes were found in vac	cinated macaques – defi	ned by T-cell
p24(273–287)	p24(141–156)	IVRMYSPTSILDIRQC	Peptide stimulation in vitro	human	[Bedford et al.(1997)]
	NOTES:  • This epitope  • Matches 3/3	<b>TES:</b> This epitope elicits a primary proliferative response in PBMC from uninfected donors Matches 3/3 anchor residues for HLA DR: <b>IVRMYSPTS</b>	in PBMC from uninfectes	d donors	
p24(282-301)	p24(?150–169) <b>NOTES:</b>	ILDIRQGPKEPFRDYVDRFY?	HIV infection	human	[Schrier et al.(1989)]
	<ul> <li>Stimulates T</li> </ul>	Stimulates T-cell proliferation in HIV-infected donors	S.		

Location	WEAU	Sequence	Immunogen	Species(HLA)	References
p24(278–292 IIIB B10)	p24(146–160) NOTES:	SPTSILDIRQGPKEP	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
p24(283–297)	p24(151–166)	151–166) LDIRQGPKEPFRDYVC Peptide stimulation human in vitro	Peptide stimulation in vitro	human	[Bedford et al.(1997)]
	NOTES: • This epitope	TES:  This epitope elicits a primary proliferative response in PBMC from uninfected donors	in PBMC from uninfecte	d donors	
p24(287–309)	p24(?155–177)	QGPKEPFRDYVDRFYKT- LRAEQA?	Peptide immunization	murine	[Nakamura et al.(1997)]
	NOTES:  • Mice immun  • This immun	TES:  Mice immunized with this peptide generated proliferative responses, CTLs as well as antibodies This immunogenic domain is from a highly conserved region of p24	rative responses, CTLs a ed region of p24	s well as antibodies	
p24(287–306)	p24(156–174) <b>NOTES:</b>	QPKEPFRDYVDRFYKTLRA	HIV-1 infection	human	[Adams et al.(1997)]
	<ul> <li>One of four immunogen</li> <li>T cells from 5 of 21 HIV</li> <li>Improved assay system of proliferative response</li> </ul>	One of four immunogenic Gag peptides used in study of the proliferative response T cells from 5 of 21 HIV+ individuals responded to this epitope Improved assay system (increase in culture time to 8 days and addition of IL-2 to c of proliferative response	dy of the proliferative resthis epitope 8 days and addition of IL	oonse to p24 2 to cultures) gave increased detection	sed detection
p24(288-302 IIIB B10)	p24(156–170)	GPKEPFRDYVDRFYK	HIV infection	human	[Wahren et al.(1989b), Wahren et al.(1989a)]
	<b>NOTES:</b> • 12 gag and 1	<b>TES:</b> 12 gag and 18 env T-cell sites were identified that could commonly evoke T-cell responses	ould commonly evoke T-	zell responses	
p24(313–327)	p24(181–196)	VKNWMTETLLVQNANC	Peptide stimulation in vitro	human	[Bedford et al.(1997)]
	NOTES:     This epitope     Matches 3/3	TES: This epitope elicits a primary proliferative response in PBMC from uninfected donors Matches 3/3 anchor residues for HLA DR: VKNWMTETL	in PBMC from uninfecte	d donors	

## HIV Helper-T Cell Epitopes

	p24		p24		p24	Location
NOTES:  • Immunizatic response to 1 et al.(1998)]	p24	NOTES:  • Immun lived i:  • Two o	p24	NOTES:  • Immu count,  • Immu	p24	WEAU
<b>TES:</b> Immunization with gp120 depleted HZ321 virus (REMUNE $^{TM}$ ) triggered an i response to native p24, a clade B virus and clade E viral antigens – Z321 is clade et al.(1998)]		Immunization of HIV+ people with a HIV-1 p17/p24 Ty virus-like particle (p24-VLP) resulted in a marginal, short-lived increased proliferative response to p24 and p17 and a transient elevation in viral load Two of four subjects that received 500 or 1000 $\mu$ g of p24-VLP had an increase in gag-specific CTL		Immunization of HIV+ people with a p24-VLP virus-like particle did not significantly impact CD4+ lymphocyte count, viral load, or p24 antibody titre Immunization with p24-VLP showed a modest, short-lived increased proliferative response to p24		Sequence
virus (REMUNE $^{TM}$ ) trigger lade E viral antigens – Z $321$ i	gp120 depleted HZ321	p17/p24 Ty virus-like partic and p17 and a transient elev 00 $\mu$ g of p24-VLP had an in	p24-VLP virus-like particle	VLP virus-like particle did i est, short-lived increased pro	p24-VLP virus-like particle	Immunogen
ed an increase in lymphocyte proliferatives clade A in env and clade G in gag. [Moss	human	le (p24-VLP) resulted in a ation in viral load crease in gag-specific CTL	human	not significantly impact CI liferative response to p24	human	Species(HLA)
yte proliferative G in gag. [Moss	[Moss et al.(1998)]	marginal, short-	[Klein et al.(1996)]	04+ lymphocyte	[Kelleher et al.(1998)]	References